KEVICC Key Stage 4 Curriculum Subject: Mathematics	Key Vocabulary and notation.

Autumn Half-Term

Term: Year 9 Autumn Term – Block Five	Topic: Basic Algebra

What is the essential knowledge from this unit?
What do students need to remember and understand?

	Specification content	Specification notes
A1	Use and interpret algebraic notation, $3a$ for $a \times 3$ and $a + a + a$ ab for $a \times b$ $\frac{a}{3}$ for $a \div 3$ a^2 for $a \times a$ a^2b for $a \times a \times b$ • coefficients written as fractions rather than decimals • brackets	it is expected that answers are given in simplest form without an explicit instruction given in the question

Students should be able to:
• use notation and symbols correctly
• understand that letter symbols represent definite unknown numbers in equations, defined quantities, or variables in formulae, and in functions they define new expressions or quantities by referring to known quantities.

N3	Use conventional notation for priority of operations, including powers, roots and reciprocals	

Students should be able to:
• add, subtract, multiply and divide using commutative, associative, and distributive laws
• understand and use inverse operations
• use brackets and the hierarchy of operations
• solve problems set in words.

A3	understand and use the concepts and vocabulary of expressions, equations, formulae, <u>identities</u>, inequalities, terms and factors	this will be implicitly and explicitly assessed

Students should be able to:
• understand phrases such as 'form an equation', 'use a formula', 'write down a term', 'write an expression' and 'prove an identity' when answering a question
• recognise that, for example, $5x + 1 = 16$ is an equation
• recognise that, for example, $V = IR$ is a formula
• recognise that $x + 3$ is an expression
• recognise that $(x + 2)^2 \equiv x^2 + 4x + 4$ is an identity
• recognise that $2x + 5 < 16$ is an inequality
• write an expression
• know the meaning of the word 'factor' for both numerical work and algebraic work.

A4	Simplify and manipulate algebraic expressions <u>(including those involving surds)</u> by: • collecting like terms • multiplying a single term over a bracket taking out common factors	

Students should be able to:
• understand that algebra can be used to generalise the laws of arithmetic
• manipulate an expression by collecting like terms
• write expressions to solve problems
• write expressions using squares and cubes
• factorise algebraic expressions by taking out common factors
• multiply two linear expressions, such as $(x \pm a)(x \pm b)$ and $(cx \pm a)(dx \pm b)$, for example $(2x + 3)(3x - 4)$
• multiply a single term over a bracket, for example, $a(b + c) = ab + ac$
• know the meaning of and be able to simplify, for example $3x - 2 + 4(x + 5)$
• know the meaning of and be able to factorise, for example $3x^2y - 9y$ or $4x^2 + 6xy$
• factorise quadratic expressions using the sum and product method, or by inspection (FOIL)
• factorise quadratics of the form $x^2 + bx + c$
• factorise expressions written as the difference of two squares of the form $x^2 - a^2$
• use the index laws for multiplication and division of integer powers.
• simplify algebraic expressions, for example by cancelling common factors in fractions or using index laws.

A4h	Simplify and manipulate algebraic expressions (including those involving surds and algebraic fractions) by:
	• collecting like terms
	• multiplying a single term over a bracket
	• taking out common factors
	• expanding products of two or more binomials
	• factorising quadratic expressions of the form $x^2 + bx + c$, including the difference of two squares; factorising quadratic expressions of the form $ax^2 + bx + c$
	• simplifying expressions involving sums, products and powers, including the laws of indices.

Students should be able to:
- multiply two or more binomial expressions
- factorise quadratic expressions of the form $ax^2 + bx + c$
- simplify by factorising and cancelling expressions of the form $\dfrac{ax^2 + bx + c}{dx^2 + ex + c}$

What prior learning supports understanding of this content?
- Use and interpret algebraic notation.
- Understand equality.
- Use fact families.
- Understand and use inverse operations.
- Find numbers that satisfy an equation with two unknowns
- Enumerate possibilities of combinations of two variables.
- Generate and describe linear number sequences.
- Express missing number problems algebraically.

How does this content link to future learning?
- Work with co-ordinates in all four quadrants.
- Plot graphs of equations that correspond to straight-line graphs in the coordinate plane; Use the form y = mx + c to identify parallel lines and perpendicular lines.
- Find the equation of the line through two given points, or through one point with a given gradient.
- Identify and interpret gradients and intercepts of linear functions graphically and algebraically.

Reading: *Where in the unit are students supported to read complex academic text?*
- Reading and understanding mathematical questions and problems' – teacher input.
- Decoding complex examination questions - explain what they are asking the student to do' – teacher input.
- Following instructions to solve problems - break down the tasks – teacher input.
- Recognising terminology, numbers, and symbols.

Writing: *Independent writing tasks and how they are structured*
- Using the correct subject specific terminology for numbers and symbols – examination papers, class books.
- Responding to questions that ask for an explanation or a reason – examination papers, class books.
- Self-evaluation, reviewing, reflecting and analysis of own work – class books, personalised learning checklists and analysis.
- Creating notes that can be used later for revision purposes - class books, revision cards, mind maps etc.

Key assessments:
How will do students review the information learned?
End of block assessments.
AQA end of block assessments provide a quick progress check at the end of each block of learning to make sure students have understood the content being covered. These are available for both foundation and higher tiers.
End of term/year assessments and mock examinations.
End of term assessments assessing the students' progress towards targets and provide diagnostic information to modify future teaching.
End of year 9 and 10 examinations assessing the students' progress towards targets and provide diagnostic information to modify future teaching.
Two mock examinations seasons take place during year 11 using previous years AQA 8300 examination papers. Students to experience the full suite of papers at both Foundation and higher tiers using Non-calculator and Calculator requirements.
All examinations will explore the three examination papers at both foundation and higher tiers using non-calculator and calculator requirements.
How will feedback be seen?
Marked end of block, term assessments and mock examinations.
Personalised learning checklists for all assessments identifying strengths and areas of development.
Written teacher feedback and marking in compliance with faculty and College Marking Policies. Student responses to marking. Students self-mark using purple pen. Verbal feedback given every lesson from teacher and peers as appropriate. Teacher and student self-assessment of presentation of class books will be completed to ensure written work is of high standard and students are achieving their potential.